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Sulfur isotopic ratio of DMS and DMSP from Lake Kinneret

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Volatile Organic sulfur compounds (VOSC) such as dimethylsulfide (DMS) are an important source of biogenic sulfur to the atmosphere. The main precursor of DMS is dimethylsulfoniopropionate (DMSP), a common osmolyte in marine algae. Atmospheric release of VOS compounds contributes to the formation of sulfate aerosols. The latter are of global importance due to their role as cloud-condensation nuclei. VOSC are abundant in terrestrial environments as well and may be involved in important biogeochemical cycles. In lake sediments, another mechanism for the formation of DMS by H_2S methylation may be important. The $^{34}S/^{32}S$ ratio (d^{34}S values) of DMSP of marine surface water around the globe is very homogeneous ranging between +18.9 ‰ to +20.3 ‰ and the fractionation between DMSP and DMS is $<$ +1 ‰ (Amrani et al. 2013). The δ^{34}S values of DMS and other VOSC in sediments should be ^{34}S depleted, similar to its H_2S precursor (Oduro et al., 2011). Our goal was to quantify the benthic DMS and DMSP emissions from the sediments of warm monomictic Lake Kinneret relative to their formation by surface water algae by using sulfur isotope ratios. Water column samples and sediment samples from Lake Kinneret were purged and trap in order to extract the VOSC and then introduced to a GC/MC-ICPMS for isotopic measurements (Amrani et al. 2013). The δ^{34}S of DMSP in the water and sediment columns of Lake Kinneret a mesotrophic monomictic lake were measured. Our preliminary results show δ^{34}S values for DMSP ranged between +10.3 ‰ and +13.4 ‰ in the water column. The sulfate δ^{34}S values ranged between +12.6 ‰ to +14.9 ‰. δ^{34}S –DMSP in the sediment column showed similar values between +9.4 ‰ and +13.0 ‰, indicating a similar sulfur source. Similar δ^{34}S values obtain for other VOSC such as ethanethiol that contributes significantly to the VOSC of Lake Kinneret sediments.

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